

WLL call control information elements and most preferably in one CC message.

The messaging system/method preferably includes any or all aspects of the up/downgrading, the service negotiation and the interworking procedures and the <<BASIC-SERVICE>> element described below.

The present invention suitably relates to a system for, for instance, providing teleservices for FAX and short message (such as GSM SMS) transfer. This may suitably allow for GSM interworking and also, generally, may extend the capabilities of DECT systems. In the future the demand for data messaging may also expand to other teleservices/data services (such as Internet based messaging/file transfer) and the present invention may preferably provide for this too. Employing a preferred embodiment of the invention a DECT system may expand from a cordless telephone system into a multipurpose information system with a wide variety of information services. At the same time it may offer also basic voice traffic and hence widen the possibilities for DECT service providers and manufacturers.

The present invention suitably provides a messaging service for a DECT system which can provide a wide variety of network services with a single new protocol layer compared to prior art DECT systems. In this way a simple and cheap portable terminal with wide variety of messaging/data services may suitably be provided for users. The protocol preferably contains a general set of minimum functionality for all alternate services, because the services contain such a wide variety of different options that it may conceivably be difficult to accomplish all functions of different services at the same time while maintaining a low level of complexity of a protocol.

The new protocol layer will be referred to as a multipurpose messaging service (MMS). The MMS protocol may preferably provide for general interworking to multiple information services such as T.611 Fax, GSM SMS, CCITT X.400 and internet HTTP.

The protocol may preferably be usable by both short messaging and fax/file services. The principal difference between these type of services is in the transmission capability: the short messaging preferably uses only the control channel (C-plane) for MMS signalling and user data transfer whereas the fax/file service preferably uses the traffic channel (U-plane) for user data and control channel (C-plane) for MMS signalling. This type of structure can suitably provide a flexible service. That is, a U-plane bearer service (C.2 data profile) can suitably be upgraded into fax/file transfer-teleservice by adding the MMS protocol on it. Also short messaging (E profile) can suitably be upgraded to a fax service by adding the U-plane service to the short messaging. Downgrading is preferably also possible. These procedures can suitably be done during already established connection as illustrated in FIG. 2. This procedure can be utilized for instance by sending the user a short message indicating that a fax is arriving. The user can, if he is capable to receive the fax, upgrade his short message connection into a fax capable high speed service to receive the fax.

Since the prior art DECT air interface typically supports only a limited service negotiation capability, the present invention preferably also provides for a new flexible service negotiation, suitably by adding new elements to some DECT messages. In this way the service negotiation may suitably be more flexible and some interworking unit/network service parameters may suitably be negotiated/changed even during call establishment. Also a new coding of the DECT IWU selection (<<iwu-attributes >>) element may prefer-

ably be used to provide more general coding to IWU service selection. This may help to overcome the problem that prior art DECT coding is only ISDN oriented and does not fit well into general data service selection. The new coding is preferably backwards compatible with the old coding.

Aspects of the present invention may help to provide the following advantages:

- allowing a wide set of services to be accessed in a standardized simple way;
- providing relatively simple terminal applications, so the terminals can be simple and cheap;
- providing an up/down grading procedures allowing a user friendly flexible service system to be implemented;
- allowing expansion of the DECT systems and terminals for future data services;
- minimizing the changes required in the DECT protocol layers
- keeping close to the GAP DECT general voice profile, reducing the changes required in standard DECT terminals

Processing aspects of the present invention may suitably be provided by appropriate software operating under the control of a processor in a fixed or portable part.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described by way of example only, with reference to the accompanying schematic drawings, in which:

- FIG. 1 shows DECT layers and services;
- FIG. 2 shows the upgrading/downgrading procedures;
- FIG. 3 shows MMS definitions;
- FIG. 4 shows MMS API relations;
- FIG. 5 shows MMS interaction half API and non-API cases;
- FIG. 6 shows MMS interaction full API case;
- FIG. 7 shows MMS internal structure;
- FIG. 8 shows modeling;
- FIG. 9 shows the complete MMS layer structure;
- FIG. 10 shows the full-API MMS model;
- FIG. 11 shows the half-API MMS model;
- FIG. 12 shows the non-API MMS model;
- FIG. 13 shows the MMS general functional model;
- FIG. 14 shows the horizontal functions related to MMS messaging;
- FIG. 15 shows MMS implementation for E and F profiles;
- FIG. 16 shows the MMS action relations;
- FIG. 17 shows MMS send action options;
- FIG. 18 shows MMS retrieve action options;
- FIG. 19 shows MMS Command action options;
- FIG. 20 show MMS Status action options;
- FIG. 21 shows MMS SETUP and CONNECT actions;
- FIG. 22 shows MMS RELEASE action;
- FIG. 23 shows MMS implementation for E and F profiles;
- FIG. 24 shows the upgrading/downgrading procedures;
- FIG. 25 shows outgoing MMS call;
- FIG. 26 shows incoming MMS call;
- FIG. 27 shows the BASIC-SERVICE information element;
- FIG. 28 shows the CALL-ATTRIBUTES information element;